

United States Patent

[11] 3,611,333

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a part interest

3,040,141	6/1962	Whildin et al.	340/281 X
3,056,951	10/1962	Tooni	340/224
3,150,361	9/1964	Conigliaro	340/281
3,257,653	6/1966	McCorkindale	340/224
3,440,347	4/1969	Spencer et al.	340/224 UX
3,500,376	3/1970	Cooper	340/283 X
2,161,707	6/1939	Hathaway	343/900 X
2,366,060	12/1944	Schneider	317/49 X
3,266,029	8/1966	Callahan	340/283 X

FOREIGN PATENTS

507,682	11/1954	Canada	340/281
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[54] MAILBOX OPERATED ELECTRONIC SIGNAL
DEVICE
1 Claim, 7 Drawing Figs.
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200/61.63, 232/37, 325/102, 325/362, 340/281
[51] Int. Cl. G08b
21/00, G08c 17/00, B65d 91/00
[50] Field of Search 340/281,
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325/102, 119, 170, 362, 477

[56] References Cited
UNITED STATES PATENTS
2,937,269 5/1960 Miller 340/224 UX

ABSTRACT: A rural mail indicator signal system of the electric type, comprising a miniature solid state crystal-controlled radio signal transmitter at the mailbox, which sends out a pulselike signal when the mailbox door is opened or closed. In the residence a miniature radio receiver intercepts the pulse signal and converts it to either an audible signal, or a visual signal, or both.

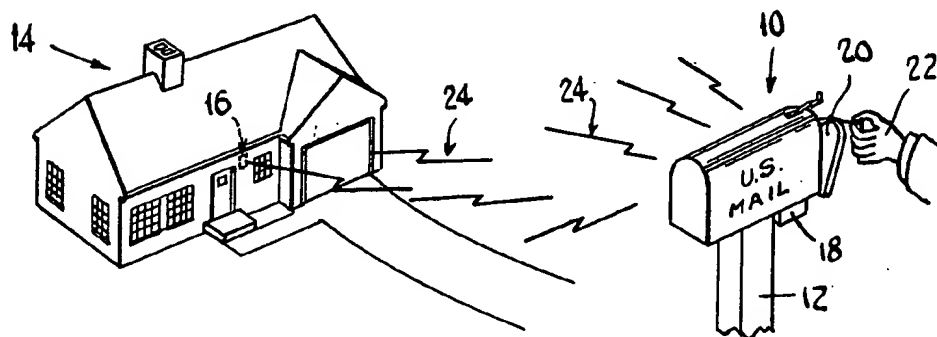


Fig. 1

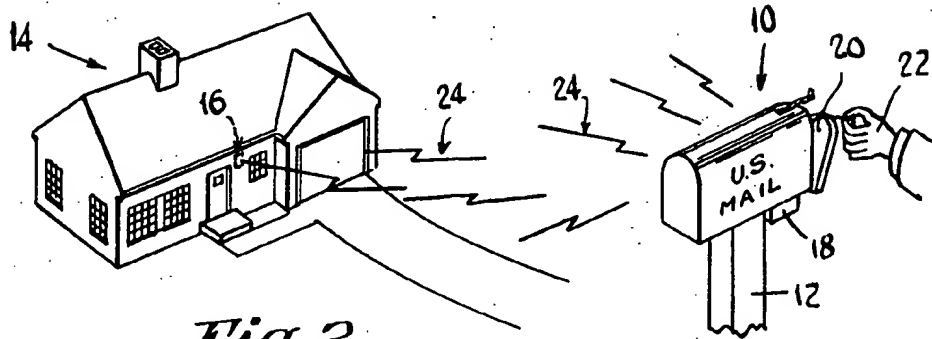


Fig. 2

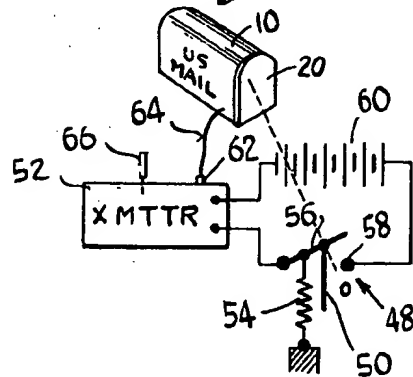


Fig. 3

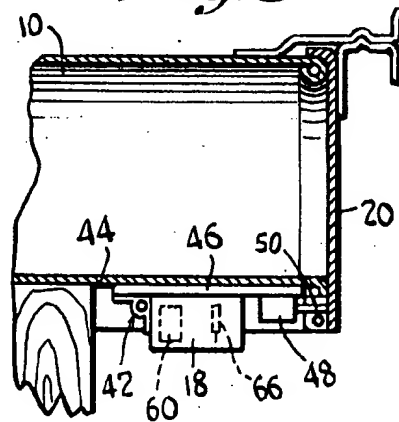


Fig. 4

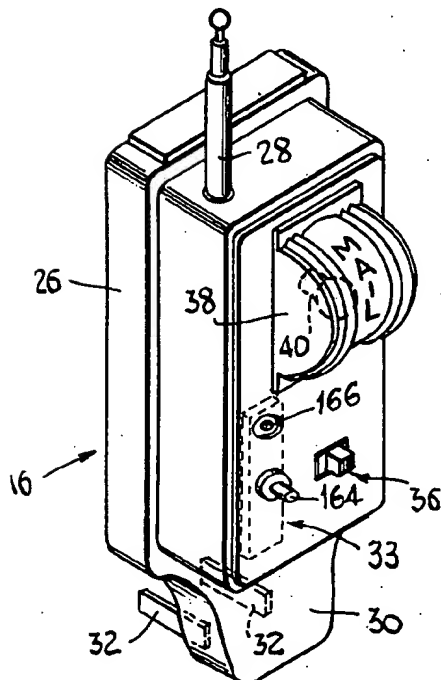
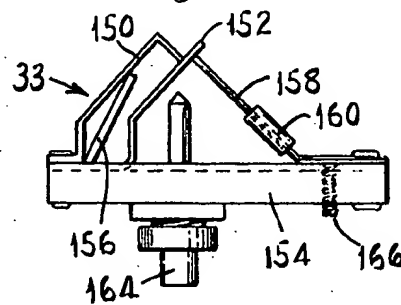


Fig. 7



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Fig. 5

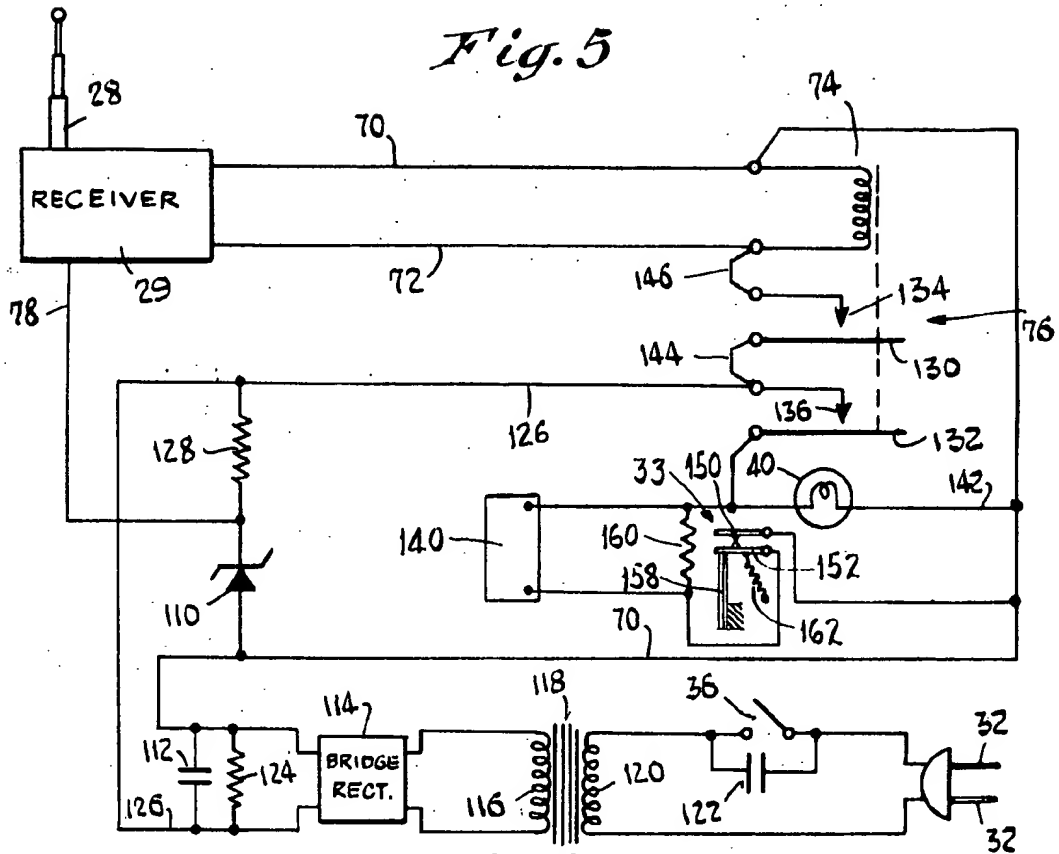
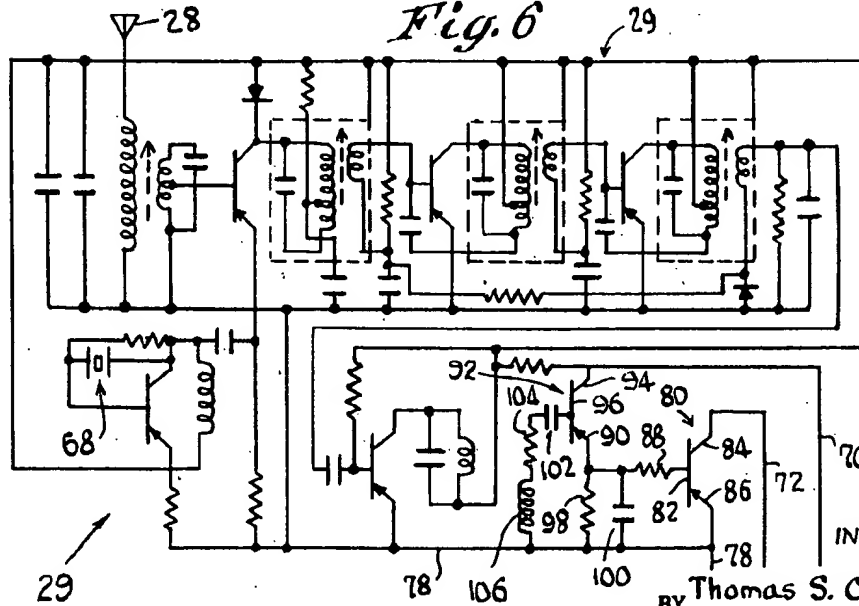


Fig. 6



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MAIL BOX OPERATED ELECTRONIC SIGNAL DEVICE

BACKGROUND

This invention relates to electric devices which indicate the presence of mail being deposited in a mail box by the carrier.

Heretofore, electric mail indicator devices generally have involved wired systems wherein an electric switch at the mail box was actuated by the opening or closing of the box door, the switch being wired to a signal located within the residence to effect the desired indication. Some prior devices made use of existing electric wiring as it was already installed for door-bell or annunciator systems, thus obviating the need to install new lines except as required from the mail box to the adjoining push button for the bell, and as required in the house from the bell to the mail indicator device. However, although there was a saving as regards the stringing of long lines, the short wiring still required an electrician or skilled handyman, and this constituted a drawback. Where, as in rural areas, the mail box was remote from the residence with no existing wires, it became necessary to additionally string lines, as in the ground, from the mail box to the house. Such more extensive wiring represented an added expense in materials and labor, constituting still further drawbacks.

SUMMARY

The above disadvantages and drawbacks of prior devices of the kind indicated are obviated by the present invention, one object being to provide an improved electric mail indicator which completely eliminates the need for an electrician, for its installation. A related object of the invention is to provide an improved electric mail indicator in accordance with the foregoing, which requires an absolute minimum amount of time, effort and skill to effect its installation. These objects are accomplished by the provision of unconnected, radio wave transmitter and receiver devices located respectively at the mail box and in the residence, so arranged that operation of the mail box door causes a signal pulse to be broadcast from the transmitter and picked up by the receiver, the latter rendering operative visual signal or an audible signal or both. The transmitter is battery operated, and turned on for only an instant by means of a sweep-by type switch responding to the door movement at the mail box; it comprises a completely self-contained weatherproof unit adapted for attachment to the underside of the box. The receiver is also a self-contained unit, having a plug for reception by any 115-volt outlet receptacle of the house, whereby it is always energized and in readiness for operation.

Other features and advantages of the invention reside in the provision of an improved, remote control mail indicator as above set forth, which is selective so as to resist pulses due to operation of appliances in the residence, or operation of adjoining electronic indicators; an improved indicator as characterized, which is reliable, easily serviced, especially small and compact, relatively low in cost, and easily operated by the user.

Still other features and advantages will hereinafter appear.

In the drawings:

FIG. 1 is a diagrammatic representation of the remote control electronic mail indicator device provided by the invention.

FIG. 2 is a diagrammatic representation of the transmitter portion of the mail indicator device.

FIG. 3 is a fragmentary longitudinal section through a mail box having attached to its underside the transmitter portion of the indicator device.

FIG. 4 is a perspective view of the receiver portion of the indicator device, showing the power supply plug and also the receiving antenna.

FIG. 5 is a schematic circuit diagram of the signal and power supply system associated with the radio wave receiver, and

FIG. 6 is a schematic circuit diagram of the radio wave receiver.

FIG. 7 is a side elevational view of a thermal cutout switch for limiting the operational period of the audible signal.

The present improved mail indicator system is shown in its entirety diagrammatically in FIG. 1. In this figure there is depicted a mail box 10 carried by the usual post 12 which is supported in the earth, and a residence 14 located at a considerable distance from the mail box. Located in the residence 14 is an electronic mail indicator or signalling device 16 which is provided with a source of current, preferably by means of the domestic household voltage used for lighting, appliances, etc.

At the mail box 10 and preferably attached to the underside thereof is a weatherproof casing 18 containing a radio transmitter which is activated momentarily at the time that the door 20 of the mail box is being swung open or closed. In FIG. 1 the mail carrier's hand 22 is shown in the process of opening the door 20 prior to insertion of mail in the box. FIG. 1 also depicts the radio waves, indicated generally by the zigzag lines 24 emanating from the metal mail box 10 which is made to function as a transmitting antenna, such waves travelling to the receiving electronic indicator and signalling device 16 and actuating the latter so as to indicate the presence of mail in the box. Such indication may be either by means of an electric lamp, or else by a buzzer, bell or similar audible signal, or else both.

Referring to FIG. 4, the electronic indicator may comprise a small sized housing 26 provided with a telescopic antenna 28 and with an electric plug portion 30 comprising prongs 32 adapted to be received in a wall receptacle (not shown) providing house current. In the casing 26 there is disposed a resettable thermal cutout switch 33 adapted to render inoperative the audible signal after a short elapse of time, and also a slide switch 36 to control the energization of the receiver. Additionally there is carried by the casing 26 a lens 38 in which there is disposed an electric signal lamp 40.

Referring to FIGS. 2 and 3, the transmitter unit at the mail box is shown in greater detail. The housing 18 is mounted by means of a hinge 42 to the underside or bottom wall 44 of the box, said mounting preferably including a base plate 46 secured to the bottom and on which there is carried a sweep-type switch 48 having a spring-biased actuating finger 50, normally engaged with the inner surface of the mail box door 20. The switch 48 is normally held open by the door, as shown in the positions of FIGS. 2 and 3. However, when the mail box door 20 is either swung down and opened from the closed position of FIG. 3 or else swung up and closed from the fully open position, the actuator arm 50 will be shifted and will momentarily close and then again open the switch 48, effecting a momentary energization of the transmitter 52 indicated by the box labeled "XMTTR." In FIG. 2 the on-off switch 48 is shown as having a biasing spring 54 connected to a suitable anchorage and biasing the switch actuator arm 50 for sweeping (downward or outward) movement when it is not restrained by the mail box door 20, such sweeping movement momentarily connecting the movable contact 56 of the switch 48 with the stationary contact 58 thereof. The switch 48 is connected to a battery 60, which effects the energization of the transmitter 52. Terminals on the transmitter 52 are connected respectively to the battery 60 and the on-off switch 48, as shown in FIG. 2. The transmitter 52 has an RF output terminal 62 which is connected by a lead 64 made to act as a transmitting antenna. Or, the mail box can advantageously function as part of the antenna by having the metal base plate 46 capacitively coupled to it, in which case the plate 46 is connected to the transmitter output and also constitutes part of the antenna. With a capacitive coupling, as is well understood in the electronic arts, no electrical connections need be made between the base plate 46 and the mail box 10, and therefore the plate can be merely cemented or adhered by an adhesive to the box to obtain the capacitive coupling, thus facilitating the installation since no drilling or screwing is needed. FIG. 3 shows no drilling or screwing into the mail box 10. This is an advantage when installing the transmitter casing 18. The transmitter 52 may be of conventional construction, and may

be crystal controlled using plug-in crystals 66 by which the frequency may be changed within a given band.

Replacement of the battery 60 and changing of the crystal 66 may be easily and quickly effected by swinging down the casing 18 of the transmitter to expose the interior compartment for such purpose. Preferably the baseboard 46 remains fixedly secured to the bottom wall 44 at all times, even during replacement of the battery.

It will be understood from the foregoing that the transmitter 52 is normally not energized. However, during an actuation of the mail box door 20, both for opening the mail box and also closing it, the transmitter will be momentarily energized, causing a signal pulse to be emitted from the metal box constituting the antenna. The transmitter 52 comprises solid state components whereby no preliminary heating period is necessary, but instead a transmission of RF energy is effected immediately upon closing the energizing circuit of the battery 60 by means of the switch 48.

Considering now the receiver unit 16, referring to FIG. 4 it will be understood that in place of the plug-in portion 30 of the casing 26 there may be provided a line cord having a two-prong plug for connection with a suitable receptacle whereby the casing and receiver unit may be located at a distance more remote from the power receptacle. A suitable solid-state circuit for the RF receiver 29 of the unit 16 is shown in FIG. 6. The receiver 29 is also crystal controlled, there being shown a crystal 68 for this purpose. The control receiver circuit includes a pickup antenna which comprises the telescopic collector 28 shown in FIG. 4. Most of the receiver circuit is conventional, and accordingly those components not directly concerned with the novel aspects of the present invention are not described herein.

The receiver circuit of FIG. 6 is of the type arranged to effect a control when it receives the proper RF signal at the antenna 28. For this purpose, the receiver has output wires 70, 72 which in FIG. 5 are shown as connected with the coil 74 of a relay 76. The wire 70 is also part of the energizing or power supply circuit for the receiver, which has another wire 78 constituting the other power supply lead. The control receiver has an output transistor 80 having a base 82, a collector 84, and an emitter 86. The collector 84 and emitter 86 are connected respectively to the wires 72 and 78, and the base 82 is connected through a resistor 88 to the emitter 90 of a preceding transistor 92 having a collector 94 and a base 96. The emitter 90 is connected through a resistor 98 to the power lead 78, and is bridged by a capacitor 100. In accordance with the invention, the base 96 is connected to a capacitor 102 which has a value of 10 microfarads, such capacitor being connected to a 6,200 ohm resistor 104 which is in turn connected to an RF choke 106 having its other end connected to the power lead 78. The provision of the resistor 104 and capacitor 102 connected to the base 96 of the transistor 92 renders the receiver circuit more selective and less sensitive to RF disturbances other than the intended signal pulse, as may be occasioned by the operation of lights, appliances or other equipment in the domicile. 102, 104 comprise a delay circuit.

The signalling device circuit which includes the control receiver 29 is given in FIG. 5. The power supply wires 70, 78 for the receiver have a Zener diode 110 connected across them for close control of the supply voltage, the wire 70 going to the negative terminal of an electrolytic filter capacitor 112 and to the output of a bridge rectifier 114 which is supplied from the secondary 116 of a power transformer 118 having its primary 120 connected with the supply plug or prongs 32. The on-off switch 36 is bridged by a capacitor 122, in accordance with invention, to eliminate arcing and spikes which could activate the receiver. The switch 36 is connected to the supply from the plug prongs 32.

The positive output terminal from the bridge 114 is connected to the positive side of the filter capacitor 112, which latter is bridged by a bleeder resistor 124 providing a load for the bridge. The positive side of the bridge 114 is connected to a wire 126 which connects through a resistor 128 to the Zener diode 110.

The relay 76 has movable contacts 130, 132 which are normally open and cooperable with stationary contacts 134, 136. The movable contact 132 is connected to the signal lamp 40 and to an audible signal or buzzer 140, the latter being connected through the thermal cutout switch 33 with the negative line 70. The lamp 40 is connected by a wire 142 to the negative line 70. The stationary contact 136 of the relay is connected with the wire 126 which is the positive side of the DC power unit. The stationary contact 136 is also connected by a jumper 144 to the movable contact 130, thus constituting a holding circuit for the relay. The stationary relay contact 134 is connected by a jumper 146 with the relay coil 74.

The thermal cutout switch 33 is described and claimed in detail in U.S. Pat. No. 3,258,564 issued June 28, 1966 and entitled "Automatic Thermal Cutout For Use With Mail Box Indicator and Door Signal" and accordingly no claims thereto are made herein. Briefly described, the switch 33 comprises normally engaging cooperable leaf spring contact blades 150, 152 carried by a base 154 which also carries a rigid stop arm 156 engaging the blade 150 to prevent forward movement of the latter beyond a certain limit. The base 154 mounts a bimetal arm 158 on which there is disposed a heater 160, comprising at least 100 ohms of resistance wire. The end of the arm 158 abuts the spring contact 152 which is biased away from the arm 150 (represented by the spring 162 in FIG. 5) and normally maintains the arms 150, 152 engaged with each other whereby the circuit through the buzzer 140 is not interrupted. The base 154 has a downward biased reset plunger 164 which can be depressed (shifted upward in FIG. 7) to move the blades 150, 152 away from the bimetallic arm 158 so that the latter can reset to the positions shown in FIGS. 5 and 7. An adjusting screw 166 bears against the bimetallic arm 158 to vary the time of delay in opening of the switch.

Operation of the signalling device is as follows: Normally the on-off switch 36 is kept closed whereby a continuous DC supply voltage is had at the wires 70, 126, and in turn at the wires 70, 78. The relay 76 is normally deenergized and open, as shown. When the RF receiver 29 is activated by a signal received at the antenna 28 and sent out from the transmitter 52, this will effect a switching of the control wire 72 to the positive supply wire 78 by means of the output transistor 80, thus causing energization of the coil 74 of the relay 76. The relay contacts will then close, whereupon a holding circuit is established from the positive supply wire 126 to the control wire 72. Such holding circuit will maintain the energization of the relay when the signal received by the receiver 28 is discontinued. It will be remembered that such signal is of momentary duration, due to the momentary closing of the transmitter switch 48. The closing of the relay 76 and the maintaining of the relay contacts close will not result in the signal bulb 40 being energized through the relay contacts 132, 136, and will also result in the buzzer 140 sounding due to the thermal switch 33 being in the closed condition. The resident of the domicile will not be apprised of the fact that the mail box door has been actuated, as by the insertion of mail therein, and such mail may therefore be picked up.

With energization of the buzzer 140, the heater 160 will be energized. This heats and flexes the bimetallic arm 158 to the left as viewed in FIG. 5 or upward and to the right as viewed in FIG. 7. The arm 158 thereby disengages from the blade 152, permitting the latter to separate from the blade 150 and opening the circuit through the buzzer 140 and heater 160. The buzzer becomes silent and the lamp 40 assumes full brilliance. The resident resets the signal device by merely pushing the plunger 164 to reestablish the contacts 150, 152 into engagement, and by actuating the slide switch 36 to the open and then back again to the closed position. This actuation of the switch 36 deenergizes the relay 76, breaking the holding circuit thereof and resetting the signal for its next operation.

It will now be understood from the foregoing that I have provided a novel and improved remote control mail indicator device comprising a radio transmitter which is located at the mail box and is automatically actuated as the mail box door is opened and closed, and comprising a receiver unit located at a

distance from the mail box, in the domicile which the mail box serves. Solid state circuitry is used throughout, and the transmitter and receiver units accordingly are instant acting and may be extremely small and compact in construction. The frequency is preferably controlled by the use of crystals, whereby adjoining domiciles may utilize systems having different frequencies to eliminate interference with similar systems or with garage door operators.

An important advantage of the transmitter-switching arrangement illustrated herein resides in the fact that the transmitter is activated twice when the mail is being inserted by the carrier. The first activation is effected by opening the mail box door, and the second activation is effected by closing the door. Thus, if for some reason the opening door movement fails to establish the signal, there is a second opportunity to establish the signal as the mail box door is closed.

The novel method of the invention comprises a signalling procedure which involves activating a radio transmitter at the mail box in response to operation of the box door, intercepting the transmitter signal by a receiver located in a building remote from the mail box, and rendering a sensory signal operative in the said building in response to activation of the radio receiver. The method involves maintaining the sensory signal operative after the receiver has been pulsed.

Variations and modifications are possible, within the scope

of the claims.

I claim:

1. A mail indicator device comprising, in combination, a miniature radio transmitter and means for mounting the same on the mail box; means for momentarily switching on the transmitter in response to operation of the mail box door in a given direction; a transmitting antenna connected to said transmitter; a receiving antenna and a radio receiver connected to the same and adapted to be activated by a signal broadcast from the transmitter; a sensory signal device; means responsive to activation of said receiver, for rendering operative the sensory signal device; a mail box, said means for mounting the transmitter comprising a base attachable to and disposed exteriorly of the mail box and a housing hingedly secured to the base and swingable away therefrom to expose the housing interior, said transmitter including a battery carried in the housing for power and the swinging away of the housing providing for accessibility to the battery to facilitate replacement thereof; said switching means comprising a switch mounted on the base and engageable with the mail box door said base comprising a metal plate connected to the transmitter output and capacitively coupled to the mail box, said baseplate and mail box constituting the transmitting antenna.

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